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GB 1135772
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US 3595445A
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(54) **Tap assembly for a container**

(57) A tap assembly for a container provided with a spout 11, comprises a sleeve 12 mountable within the spout 11, a cover member 27 extending across the inner end of the sleeve 12 to isolate the interior of the sleeve 12 from the spout 11, valve means 15, 30 closing off the outer end of the sleeve 12 and for controlling flow of liquid from the sleeve 12 to an outlet 29 when the cover member is displaced or ruptured, and a displaceable member 13 located within the sleeve 12 and movable, by deformation of a flexible wall 19, from a storage position to a position where it displaces or ruptures or effects rupturing of the cover member 27 to allow liquid to flow from the container spout 11, through the sleeve 12 and valve means 15, 30 to said outlet 29.

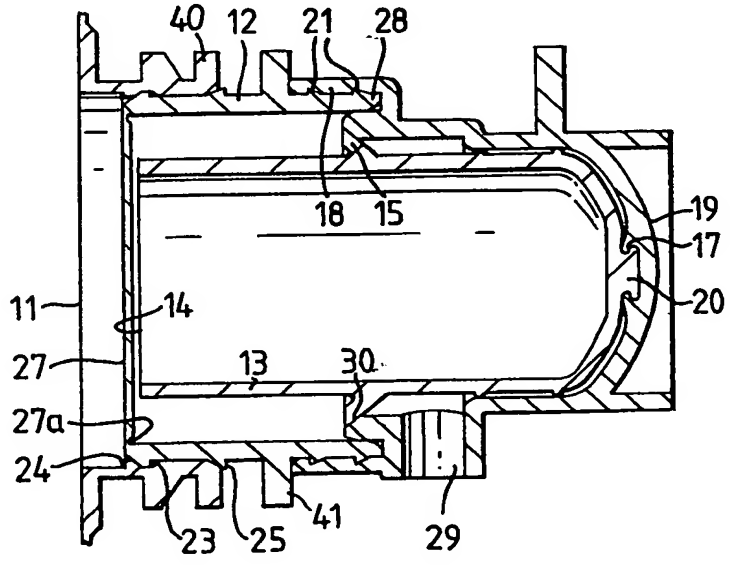

Fig.1.

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The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

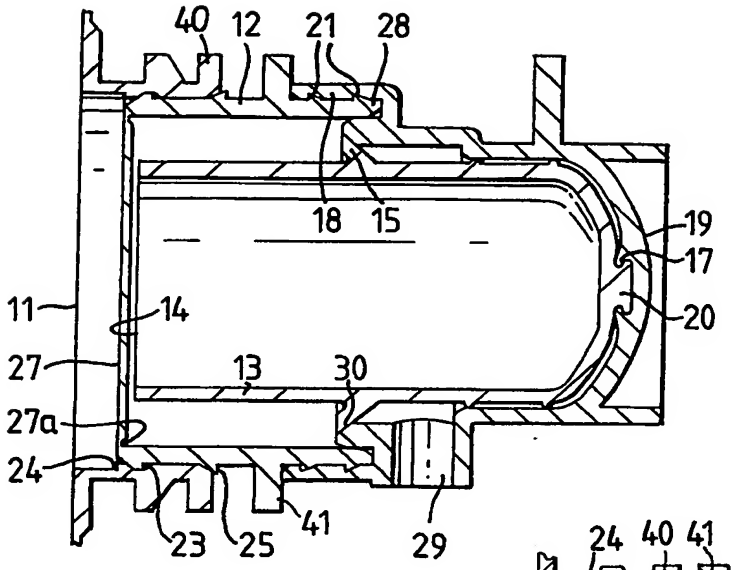

Fig.1.

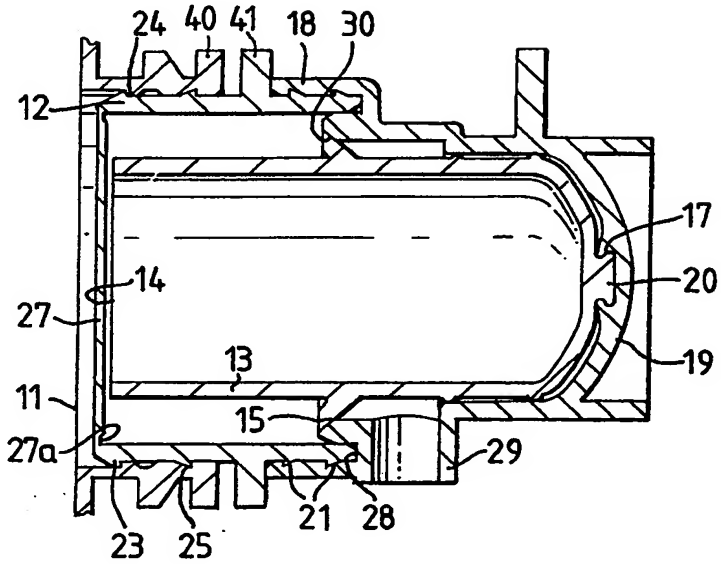

Fig.2.

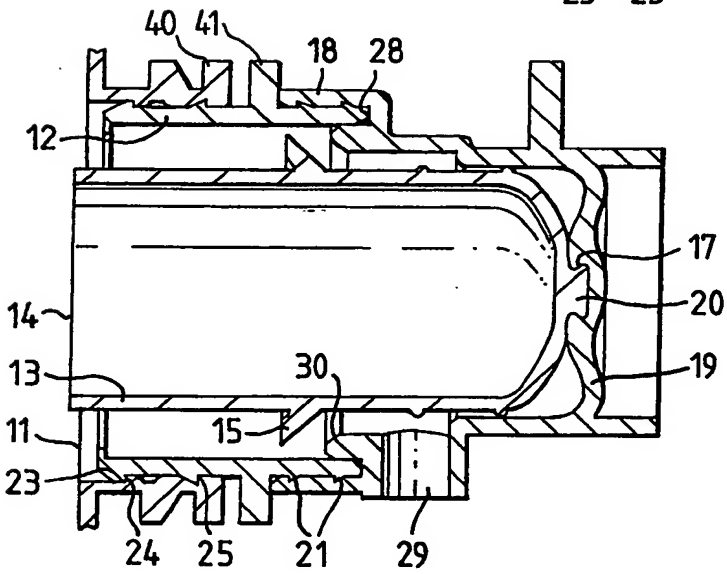

Fig.3.

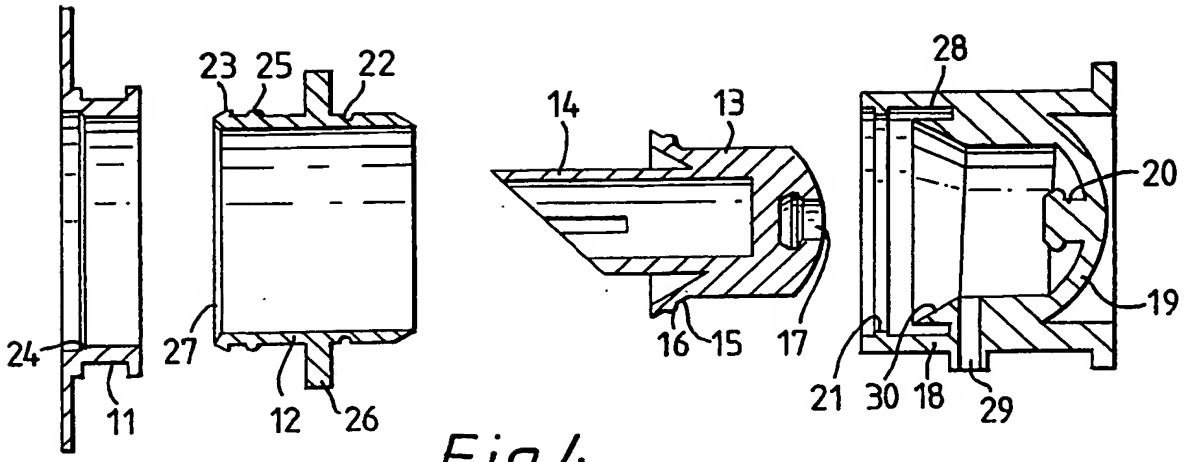

Fig.4.

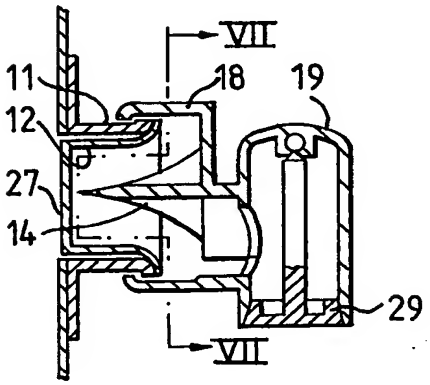

Fig.5.

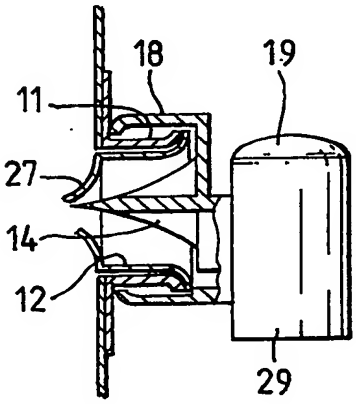

Fig.6.

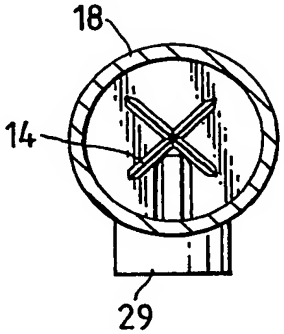

Fig.7.

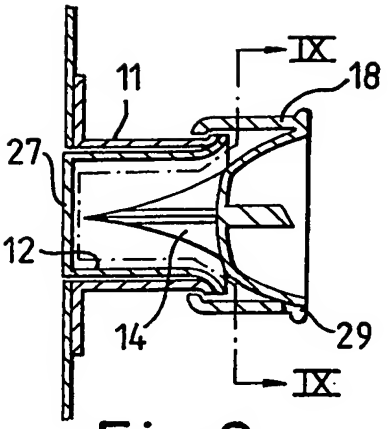

Fig.8.

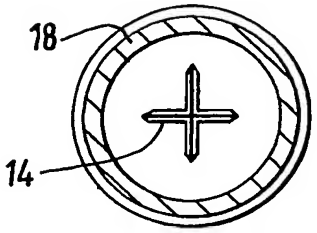

Fig.9.

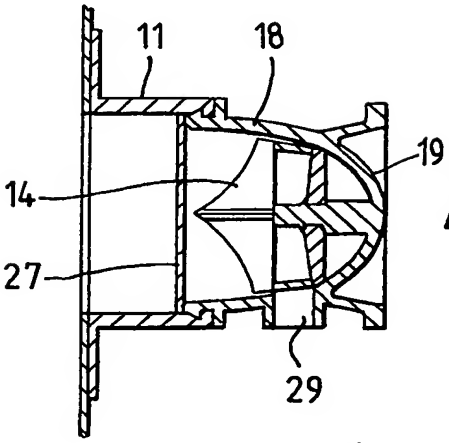

Fig.10.

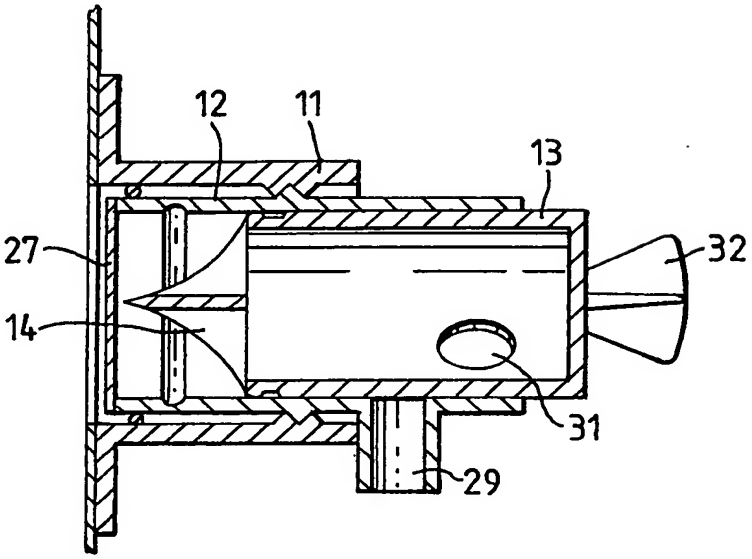

Fig.11.

SPECIFICATION

Tap assembly for a container

This invention relates to a tap assembly and particularly, but not exclusively, to a tap assembly which is suitable for use with a bag-in-box container.

Bag-in-box containers generally comprise a rigid outer container formed of cardboard or the like to hold a sealed collapsible bag which contains liquid. The container is provided with a tap or valve by which the contents of the collapsible bag may be dispensed periodically as desired. One suitable tap construction is described in Australian Patent Specification No. 446,218. The tap there described is in common use. Also in common use is a tap of the type described in Australian Patent Specification No. 500,790. These are most satisfactory taps and meet the demands of the public in that they are easily assembled by the user, are easy to use, are relatively leak proof and dispense the contents in a satisfactory manner. However containers fitted with such taps suffer from the common disadvantage that air slowly permeates the taps and may tarnish the contents of the collapsible bags. For example in the case where the contents are wine oxidation slowly tarnishes the wine. As a result the containers have a relatively short shelf life. This is despite the fact that it is now possible to provide collapsible bags that are in themselves substantially or effectively impermeable to air.

According to the present invention there is provided a tap assembly for a container, including a sleeve mountable within a container spout; a cover member closing off the inner end of said sleeve to isolate the interior of said sleeve from the container spout; valve means closing the outer end of said sleeve and for controlling emission of liquid from said sleeve; and a displacable member located within said sleeve and movable, by initial movement of said valve means, from a storage position to a tap activating position where it displaces or ruptures or effects rupturing of said cover member to allow liquid to pass from the container spout to said valve means through said sleeve. The sleeve is preferably substantially cylindrical so that when placed within the container spout it will form a liquid tight seal therewith. The inner end of the sleeve may be closed by a severable membrane which may be substantially air impermeable. The severable membrane may be provided by any suitable material such as the sheet material from which the collapsible bag itself is made. However, any suitable material may be used for this purpose provided that it is sufficiently impermeable to air to reduce the rate of air induced deterioration of the contents of the container to acceptable levels whilst at the same time it is substantially impermeable to the liquid contents of the container thus to avoid leakage.

Alternatively the cover member may be integrally moulded with the sleeve. In this case it is preferred that a line of weakness extend around and/or across the member adjacent the sleeve so that the member may be at least partially severed therefrom.

The tap assembly of the present invention includes valve means associated with the sleeve means and the container spout to provide a workable tap. The valve means may be of any suitable configuration. For example only the valve means may take the form described in the Australian Patent Specification No. 446,218, the valve means described in Australian Patent Specification 500,790 or the valve means described in the United States Patent Specification USP 3,595,445.

The tap assembly of the present invention includes a displacable member, movable by initial movement of the valve means to displace or rupture the cover member. Where the cover is a severable membrane the displacing member may include membrane piercing means. Preferably the membrane piercing means is in the form of a membrane cutting member located within the sleeve means and movable between a storage position and membrane pierced position where the membrane cutting member extends through and cuts the severable membrane. The membrane cutting member may be of any suitable configuration and of any suitable material. Preferably the membrane cutting member is of a moulded plastics material and for example may be substantially cylindrical as illustrated herein.

The membrane piercing means is preferably connected to the valve means to be movable therewith. The valve means may be telescopically mountable on the container spout so as to be movable between the storage position and the membrane pierced position. Alternatively the membrane piercing means may be associated with a valve member of the valve means to be movable between its storage position and its membrane pierced position.

Where the cover member is moulded with the tap sleeve the displacing member need not include a piercing means but rather is designed to sever the cover from the sleeve.

In one arrangement of the invention the valve means includes a valve member having a valve skirt telescopically mounted with respect to and preferably on the tap sleeve and movable between the storage position and the membrane piercing position aforesaid.

The preferred valve member includes a deformable diaphragm which may be operated by the fingers. The preferred valve member includes a valve chamber defined by the valve skirt and the deformable diaphragm. The valve member includes an outlet orifice extending through the valve skirt to provide an opening to the valve chamber. The outlet orifice may be in the form of a spout to direct liquid as is known in the art. The preferred valve member includes a valve seat at the inner edge of the valve chamber. The valve seat may be a bevilled edge valve seat, that is, in the form of an inverse frusto cone.

The preferred displacing member is reciprocally mounted partially within the valve chamber and includes a valve portion having a valve seat complementary in shape to the valve seat of the valve member. Thus in the preferred form the valve seat is in the form of a frusto cone. A resilient annular rib may be provided around the valve seat to improve the seal if desired.

Coupling means are preferably provided by which the piercing member is coupled to the deformable diaphragm. In the preferred form the coupling means includes a resilient male coupling member preferably located on the deformable diaphragm and a complementary female recess preferably in one end of the piercing member. The coupling means is so arranged as to cause the resilient diaphragm in its normal or stable position to pull the piercing member so that the respective valve seats are held in abutment thereby to seal the valve chamber and outlet from the contents of the container.

In operation when the deformable diaphragm is pressed the piercing member moves towards the pierces the severable membrane. At the same time the seal between the respective valve seats is broken. Thus the contents from the container are able to flow through the tap assembly to the outlet. When the deformable diaphragm is released it resiliently urges the piercing member into its original position where the valve seats co-operate to seal the valve chamber and consequently the outlet from the contents of the container. The deformable diaphragm may be pressed at will to release the contents through the outlet.

Preferred alternative embodiments of the present invention will now be described, by way of examples, with reference to the accompanying drawings, in which:-

Figure 1 shows in cross-section a container spout and tap assembly that embodies the present invention in a partially-assembled form;

Figure 2 shows in cross-section the assembly of Figure 1 in its storage position;

Figure 3 shows in cross-section the assembly of Figure 1 in its valve open position;

Figure 4 shows in exploded cross-section an alternative embodiment employing a membrane as cover and including piercing means;

Figure 5 shows in cross-section an alternative embodiment employing a membrane as cover and including a piercing means and alternative valve construction, the assembly being in its storage position;

Figure 6 shows in cross-section the assembly of Figure 5 in its tap activating position;

Figure 7 shows in cross-section VII an end elevation of the assembly of Figure 5;

Figure 8 shows in cross-section an alternative embodiment of a tap assembly in its storage position;

Figure 9 shows in cross-section IX an end elevation of the assembly of Figure 8;

Figure 10 shows in cross-section a further alternative embodiment of a tap assembly in its storage position; and

Figure 11 shows in cross-section an alternative embodiment of a tap assembly in its storage position.

Referring first to the embodiment illustrated in Figures 1, 2 and 3 there is a container spout 11 and a tap sleeve 12. The tap sleeve 12 is preferably telescopically mountable within the spout 11. The tap sleeve 12 may include an annular barbed portion 23 to engage a shoulder 24 within the spout in its assembled position. A sealing rib or barb 25 may be employed to engage within the spout 11 in the assembled position as is best shown in Figure 2. It will be noted that there is no corresponding recess within the spout 11 but when this is made of plastics material the rib 25 is able to deform the spout sufficient for accomodation as shown in Figures 2 and 3.

A displaceable cover member 27 may be integrally moulded with the sleeve 12. Preferably a weakened zone shown at 27a is provided in the member 27 adjacent its junction with the sleeve 12.

A displacing member 13 which may include a straight edge 14 as illustrated is provided to displace the cover member 27. However it should be appreciated that the edge 14 may be provided at an angle to the longitudinal axis of the sleeve thereby to enable the displacing member 13 to contact one part of the cover 27 adjacent a weakened zone 27A to assist in tearing the cover member away from the sleeve 12 as will be further discussed below. The displacing member 13 may include a valve seat 15 and as illustrated includes a male coupling member 20.

The valve member may include a skirt portion 18 to surround the outer edge of the tap sleeve 12 preferably with the aid of holding ribs 21. It will be noted that in the illustrated embodiment the outer edge of the tap sleeve 12 fits within a recess 28 of the valve member. The valve member illustrated in Figures 1 to 3 includes an outlet 29 and a valve seat 30 that corresponds to and is complementary to the valve seat 15 of the displacing member 13. The illustrated valve member includes a deformable diaphragm 19 and includes on its inner surface a coupling recess 17.

In use of the tap assembly illustrated in Figures 1, 2 and 3 the tap assembly is held out of the spout 11 and the container filled through spout 11. The tap assembly is then placed into the position shown in Figure 1 and then pushed inwardly to the position shown in Figure 2, which is the storage position. In this position it will be seen that the cover member 27 avoids contact of the contents and the valve components. If the cover 27 has a degree of resistance to air permeation then air permeation to the contents is significantly reduced. As an added security against air permeation the annular ribs 40 and 41 of the spout 11 and sleeve 12 may be designed to butt-up against each other and may be heat welded together using a conventional process such as ultrasonic sealing, to provide a circumferential seal. Additionally, the cover 27 may be metallised or chemically treated to improve the permeability characteristics of the tap system even further. In the embodiment illustrated in Figures 1, 2 and 3 when the deformable diaphragm 19 is pressed into the position shown in Figure 3 it causes the displacing member 13 to push the cover member 27 and sever it from the sleeve 12, at least partially. This means that contents of the container may flow to the valve chamber within the sleeve 12. At the same time movement of the deformable diaphragm 19 causes the valve seat 15 to move away from the valve seat 30 and allow the container contents to flow to outlet 29. In order to

close the valve 15 onto the seat 30 the diaphragm 30 will move the member 13 to the right as viewed in the Figures when pressure is removed from the diaphragm 19. Thereafter the valve may operate as required by pressing the deformable diaphragm 19 inwardly.

In the embodiment shown in Figure 4 there is a container spout 11 and a tap sleeve 12. The tap sleeve 12 may include an annular barbed portion 23 to engage the shoulder 24 on the container spout. The tap sleeve may include a sealing rib 25 and a locating annular rib 26 if desired.

The illustrated piercing member 13 includes a substantially cylindrical piercing portion 14 which preferably has a bevilled edge to assist in its piercing the membrane 27 that extends across the tap sleeve 12. The piercing member 14 includes the valve seat 15 and valve rib 16 as illustrated and includes a coupling recess 17.

The illustrated valve member includes a skirt portion 18. There may be an annular rib inside the valve skirt as illustrated at 21 to engage within a corresponding recess 22 on the tap sleeve 12. It will be noted that in the illustrated embodiment the outer edge portion of the tap sleeve fits within a recess 28 of the valve member. The illustrated valve member includes an outlet spout 29 and valve seat 30 that corresponds and is complementary to the valve seat 15 of the piercing member. The preferred deformable diaphragm resiliently urged into its convex position as shown is illustrated at 19 and includes on its inner surface a coupling member 20 to engage within the coupling recess 17 of the piercing member.

It will be seen that when the deformable diaphragm 19 is pressed the piercing member moves to the left so that the portion 14 pierces the membrane 27 whilst the seal between the valve seat 15 and valve seat 30 is broken allowing contents to flow to the outlet 29.

In the embodiments shown in Figures 5, 6 and 7 the spout 11 is shown in telescopic engagement with a skirt portion 18 of the valve member. The tap sleeve 12 is housed within the spout 11 and provided with a membrane 27. A piercing member 14 is provided and may be of substantial star shape as best shown in Figure 7. In this embodiment the valve is of a different type and includes a deformable diaphragm 19 and valves 10 as shown. In operation the tap assembly is removed from the spout and the container filled therethrough. The tap assembly is then placed onto the spout in the position shown in Figure 5 which is the storage position. In order to activate the tap the valve member is pushed towards the spout to the position shown in Figure 6 where the piercing member 14 extends through the membrane 27 to break it and allow the contents of the container to flow into the valve chamber ready for valve operation by pressure of deformable diaphragm 19 as is known in the art.

The embodiments illustrated in Figures 8 and 9 similarly include a skirt portion 18 on the valve member telescopically engaged with the spout 11. However, in this embodiment an alternative form of valve is illustrated. Again in operation the container is filled through spout 11 and then a tap assembly placed on to the spout in the storage position as shown in Figure 8. To activate the tap the valve member is first pushed so that the skirt 18 rides along the spout 11 and the piercing member 14 pierces the membrane 27 to allow the container contents to flow to the valve chamber ready for normal valve operation.

In the embodiment illustrated in Figure 10 the valve skirt 18 is telescopically engaged within the spout 11 and an alternative form of valve assembly is illustrated. Again in operation the container may be filled through spout 11 and then the valve assembly attached into the storage position as illustrated in Figure 10. To activate the tap assembly the valve is first pushed so that the skirt 18 telescopically moves within the spout 11. To activate the tap assembly the deformable diaphragm 19 is pressed so that the piercing member 14 extends through the membrane 27 in the manner previously described and at the same time opening the valve to allow container contents to flow through the outlet 29.

An alternative form of tap assembly is illustrated in Figure 11. Again in this embodiment there is a severable membrane 27 covering the end of a tap sleeve 12 that is located within the spout 11 in the assembled form. In this embodiment the displacing member 13 is telescopically mounted within the sleeve 12 and movable from the storage position as illustrated in Figure 11 to a tap activating position where the piercing member 14 has pierced the membrane 27 and where the valve opening 31 is located on an annulus above the spout 29. In this embodiment the valve is operated by turning the handle 32 so that the valve opening 31 is aligned with the spout 29.

It will be seen then that in accordance with the present invention the tap assembly is such as to provide a bag where the liquid contained is substantially encased in air impermeable material. Thus there is substantially less risk of the contents being tarnished by air. In previous arrangements the liquid was in contact with the valve components. These are necessarily made of materials that are resilient, have greater permeability to air and are a source of early tarnishing of the container contents. In the tap assembly of the present invention the contents contact those parts only when the seal is broken on the container being used the first time for dispensing. Thus in accordance with the invention the shelf life of the product is significantly increased.

Additionally as the contents do not come into contact with the valve means until use, the potential for the valve member as a source of leakage is removed. It has been found that the valve members have a potential for leakage during storage. This is avoided by the tap assembly of the present invention since the sealing occurs at the sleeve and severable membrane. Only when the severable membrane is pierced after first use do the contents of the container come into contact with the valve itself.

Most importantly the tap assembly of the present invention allows for the removal of the tap assembly from the spout, the filling of the bag through the

spout and the replacement of the tap assembly whilst maintaining advantages aforesaid.

It will be appreciated that many variations and modifications may be made to the above described arrangement and construction of parts without departing from the scope of the appended claims.

CLAIMS

1. A tap assembly for a container, including a sleeve mountable within a container spout; a cover member closing off the inner end of said sleeve to isolate the interior of said sleeve from the container spout; valve means closing the outer end of said sleeve and for controlling emission of liquid from said sleeve; and a displacable member located within said sleeve and movable, by initial movement of said valve means, from a storage position to a tap activating position where it displaces or ruptures or effects rupturing of said cover member to allow liquid to pass from the container spout to said valve means through said sleeve.

2. A tap assembly as claimed in claim 1, in which said rupturable cover member is integrally moulded with said sleeve and at least partially severable therefrom when said displacing member is moved to its activating position.

3. A tap assembly as claimed in claim 1 or claim 2, in which said cover member is substantially air impermeable severable membrane.

4. A tap assembly as claimed in any preceding claim, in which said displacable member includes a piercing portion to cut said cover member when said displacable member is moved to its tap activating position.

5. A tap assembly as claimed in any preceding claim, in which said displacable member is movable longitudinally within said sleeve to its tap activating position.

6. A tap assembly as claimed in claim 5, in which said displacable member is provided by a substantially cylindrical member and includes on its outer surface an annular valve seat for co-operation with a complementary valve seat of said valve means.

7. A tap assembly as claimed in claim 6, in which said valve means include a resiliently deformable valve member connected to said displacable member to resiliently urge said displacable member into a valve closed position with said seats in abutment and movable to a valve open position with said valve seats separated.

8. A tap assembly as claimed in any preceding claim, in which said displacable member is moved to its tap activating position by movement of said valve means to its valve open position.

9. A tap assembly as claimed in any one of claims 1 to 0, in which said valve means includes a valve sleeve telescopically mounted with respect to said tap sleeve and said displacable member is movable from its storage position to its tap activating position by longitudinal movement of said valve sleeve independently of operation of said valve means.

10. A tap assembly substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 3, Figure 4, Figures 5 to 7, Figures 8 to 10 or Figure 11.

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